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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,608	10/18/2001	Steven M. Lefkowitz	10010069-1	7167

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AGILENT TECHNOLOGIES, INC.
Legal Department, DL429
Intellectual Property Administration
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EXAMINER

CALAMITA, HEATHER

ART UNIT PAPER NUMBER

1637

DATE MAILED: 05/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/032,608	LEFKOWITZ ET AL.	
	Examiner	Art Unit	
	Heather G. Calamita, Ph.D.	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) 44-56 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☒ Claim(s) 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Election/Restrictions***

1. Applicant's election of Group I in Paper No. 20042603 is acknowledged. Applicant's arguments filed 04/23/04 have been fully considered but they are not persuasive. Applicant's election with traverse of Group I, claims 1-43 in paper No. 20042603 is acknowledged. Traversal was on the grounds that the claims of Groups II and III include all of the elements found in the claims of Group I therefore requiring little additional searching. The examiner maintains that the method of Group I is distinct from the apparatus of Group II, as the process claimed in Group I can be practiced by another materially different apparatus. Furthermore, there are elements of Groups II and III that do not overlap with Group I. For example Group I describes a method utilizing polymers and biopolymers, Group II describes an apparatus that utilizes a web transport system and Group III describes a computer program. These elements do not overlap and would require separate searches. The examiner maintains the restriction requirement made previously, as each group is correctly separated as unrelated or patentably distinct and the restriction is herein made final. Claims 44-56, are withdrawn from further consideration by the examiner, 37 CFR 1.14(b), as being drawn to a non-elected invention. Pending claims to be examined are claims 1-43.

Claim Objections

2. Claim 28 is objected to because of the following informalities: the word "depositions" in line 2 of claim 28 should read deposition. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 38 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "binding affinity" in claim 38 appears to mean "number of molecules adhered to the surface of the substrate" as indicated by the claim language. However, the accepted meaning of "binding affinity" is "the avidity with which a molecule binds to another molecule relating to a kinetic measurement." It is unclear as to whether the phrase refers to the concentration of polynucleotides, proteins, nucleosides or amino acids or the avidity with which they are bound. As the specification does not clearly redefine the term it is indefinite.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, are rejected under 35 U.S.C. 103(a) as being unpatentable over Gamble et al. (USPN 5,981,733, 11/09/1999) in view of Dorsel et al. (US 2002/0132261 A1, 09/19/2002).

Gamble et al. teach a method of forming arrays of polymers comprising a jetting station (equivalent to an application station see col. 3 lines 38-41) where the polymers are applied to the surface of a substrate (see whole document, especially col.5 lines 35-65). They also teach a reagent station covering multiple features with a continuous volume of reagent which chemically reacts with the precursors or the substrate (see col. 6 lines 38-40). Gamble et al. teach moving the substrate through the application and reagent stations (see col. 1 lines 66-67 and col. 2 lines 1-3). Additionally they teach repeating the method steps as needed to form the arrays on the substrate (see col. 6 lines 1-2).

Gamble et al. do not teach using a web as the substrate upon which the array is formed.

Dorsel et al. teach constructing an array unit having a substrate, a light reflecting layer on the front side of the substrate and the array features positioned forward of the light reflecting layer (see paragraph 0034).

One of ordinary skill in the art at the time the invention was made would have been motivated to apply Gamble's method for synthesizing microarrays with Dorsel's web substrate with a light-reflecting layer on the front side upon which to form the array to achieve the best detection of fluorescent labels used in array hybridizations. Dorsel et al. states the detection of the fluorescence signal emitted by the molecules on the array is better due to the decrease in the signal to noise ratio (paragraph 0008). It would have been prima facie obvious to apply Gamble's method of array synthesis with Dorsel's web substrate in order to achieve the expected advantage of better detection of the fluorescence signal emitted by the molecules on the array due to the decreased background noise.

5. Claims 3-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gamble et al. (USPN 5,981,733, 11/09/1999) and Dorsel et al. (US 2002/0132261 A1, 09/19/2002) in view of Webb (USPN 6,599,693 B1, 07/29/2003).

The teachings and suggestions of Gamble et al. and Dorsel et al. are described previously.

Furthermore, Gamble et al. teach a method of forming arrays of polymers comprising an application station where the polymers are applied to the surface of a substrate (see whole document, especially col.5 lines 35-65). They also teach a reagent station covering multiple features with a continuous volume of reagent which chemically reacts with the precursors or the substrate (see col. 6 lines 38-40). Gamble et al. teach moving the substrate through the application and reagent stations (see col. 1 lines 66-67 and col. 2 lines 1-3). Additionally they teach repeating the method steps as needed to form the arrays on the substrate (see col. 6 lines 1-

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2). They also teach exposing the substrate to a reagent bath (see col. 6 lines 38-40). They teach a positioning system for positioning the substrate during application of the reagent (see col. 5 lines 46-48). They teach exposing the substrate to same or different reagents and multiple application stations and reagents (see col. 5 lines 46-54). They further teach simultaneously applying polymers on different array regions at respective different application stations and applying the polymers to the substrate and exposing the substrate to a reagent between applications of the polymers (see col. 5 lines 33-59). They additionally teach exposing the substrate to multiple application stations without exposure to an intervening reagent (see col. 5 46-54). They teach applying polymers and oligonucleotides (oligonucleotides are biopolymers) at the application station (see col. 2 lines 41-43 and 48). Gamble et al. teach exposing the substrate in a cycle through the same application station and reagent station (see col. 5 lines 66-67, col. 6 lines 1-2). They also teach exposing the substrate to a wash fluid in a wash station (see col. 2 lines 11-12). Further, Gamble et al. teach exposing the substrate to an application station then to a reagent station, a wash station and again to the application station (see col. 5 line 67, col. 6 lines 1-2, col. 8 54-55). They also teach exposing the substrate in different directions between at least two of the reagent stations (see col. 10 lines 16-17). They further teach using an oxidizing agent that deprotects a protected linking group of a unit deposited in a same cycle so that a unit deposited in a next cycle can link with the deprotected unit previously deposited (see col. 9 lines 34-36, col. 13 lines 19-24). They teach fabricating a nucleotide array using nucleoside phosphoramidites and a reagent for deprotecting protected phosphoramidites or an oxidation reagent which oxidizes internucleoside phosphite bonds to phosphate bonds (see col. 12 lines 28-35, lines 59-66, col. 13 lines 1-2). They teach exposing the substrate to a wash station following a reagent station where the wash station covers multiple features with a continuous volume of wash fluid (see col. 13 lines 6-8). They further teach exposing the substrate to multiple deposition stations and multiple reagent stations, as well as exposing a substrate sequentially to multiple reagent stations between

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different application stations (see col. 16 lines 7-29). Additionally, they teach exposing the substrate to a reagent station followed by a wash station, between successive deposition stations (see col. 16 lines 30-67). They also teach guides rotating the substrate (see col. 4 lines 12-14).

Gamble et al. does not teach using a web as the substrate upon which the array is formed. They also do not teach drop deposition station as an application station for applying polymers, biopolymers or DNA.

Webb teaches using a drop deposition station for application of drops containing polymers (i.e. biopolymers such as polynucleotides or peptides) or their precursor units to the array substrate (see whole document, especially col. 2 lines 55-67, col. 3 lines 1-2).

One of ordinary skill in the art at the time the invention was made would have been motivated to apply Webb's method of fabricating arrays using a drop deposition station with the combined invention of Gamble and Dorsel's method of automated array synthesis using a web substrate with a light reflecting layer in order to produce an array with drop dispensers that give regularly spaced features. Webb states it's desirable to have a means of producing arrays with multiple drop dispensers that will make arrays with regularly spaced features (col. 2 lines 48-52). It would have been prima facie obvious to apply Webb's drop deposition station with to the combination of Gamble and Dorsel's method of automated array synthesis using a web substrate with a light reflecting layer to achieve the expected advantage of being able to fabricate an array with multiple drop dispensers that create arrays with fairly regularly spaced features.

6. Claims 38-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gamble et al. (USPN 5,981,733, 11/09/1999) and Dorsel et al. (US 2002/0132261 A1, 09/19/2002) in view of Pantano et al. (US2003/0054176 A1, 03/20/2003).

The teachings and suggestions of Gamble et al. and Dorsel et al. are described previously.

Gamble et al. do not teach providing a silane, polylysilane, aldehyde, amine, or a thiol linking layer to the surface of the substrate prior to applying the array. They do not teach a mixture of silanes as the linking layer or the silane having a free amino group. They also do not teach the linking layer as less than 10 angstroms thick. They do not teach a minimum binding affinity of 10^4 - 10^6 units/ μ^2 .

Pantano et al. teaches a linking layer of silane, or amino silanes with a free amine group (see whole document, especially paragraph 0027 lines 1-8). They also teach a mixture of silanes (see claim 6 p. 8). They further teach a layer of less than 10 angstroms (see paragraph 0029). Additionally they teach a minimum binding affinity of 10^4 probe droplets/cm² (see paragraph 0035 lines 11-13).

One of ordinary skill in the art at the time the invention was made would have been motivated to apply Pantano's method of providing a linking layer made of silane to a substrate with the combined invention of Gamble and Dorsel's method of automated array synthesis using a web substrate with a light reflecting layer in order to provide a reliable and high-quality biomolecule retention on the array substrate. It would have been prima facie obvious to apply Pantano's linking layer made of silane to the combination of Gamble and Dorsel's method of automated array synthesis using a web substrate with a light reflecting layer to achieve the expected advantage of being able to produce array with greater retention of the biomolecule features applied.

Summary

7. No claims were allowed.

Conclusion

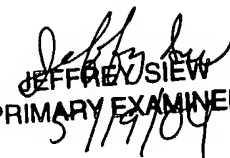
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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heather G. Calamita, Ph.D. whose telephone number is 571.272.2876 and whose e-mail address is heather.calamita@uspto.gov. However, the office cannot guarantee security through the e-mail system nor should official papers be transmitted through this route.. The examiner can normally be reached on weekdays 7:30 A.M. - 4:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571.272.0782. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

hgc


JEFFREY SIEW
PRIMARY EXAMINER
5/17/09